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## **Energy Usage in Kentucky**

According to recent estimates obtained through the Lexington Herald Leader, the average man, woman and child in Kentucky uses 70 percent more electricity than the average American. The average Kentucky industrial customer uses 427 percent more. Many of Kentucky's homes and businesses were built in a manner that reflects the historically low energy prices that have been available to us. In the face of rising energy prices one of the most important actions residents, businesses and organizations can take is to perform home energy audits and to button up the envelopes of their homes and buildings. Poor duct work, gaps in insulation and cracks around windows cost Americans millions of dollars each year. While the information below is geared toward the home, it can also apply to businesses as well.

### **Energy Audit Info from the U.S. Department of Energy**

#### **Do-It-Yourself Energy Audits**

The information below is geared toward the home, but many of the principals apply to places of work as well. You can easily conduct a home energy audit yourself. With a simple but diligent walk-through, you can spot many problems in any type of house. When auditing your home, keep a checklist of areas you have inspected and problems you found. This list will help you prioritize your energy efficiency upgrades.

#### **Locating Air Leaks**

First, make a list of obvious air leaks (drafts). The potential energy savings from reducing drafts in a home may range from 5% to 30% per year, and the home is generally much more comfortable afterward. Check for indoor air leaks, such as gaps along the baseboard

or edge of the flooring and at junctures of the walls and ceiling. Check to see if air can flow through these places:

- Electrical outlets
- Switch plates
- Window frames
- Baseboards
- Weather stripping around doors
- Fireplace dampers
- Attic hatches
- Wall- or window-mounted air conditioners.

Also look for gaps around pipes and wires, electrical outlets, foundation seals, and mail slots. Check to see if the caulking and weather stripping are applied properly, leaving no gaps or cracks, and are in good condition.

Inspect windows and doors for air leaks. See if you can rattle them, since movement means possible air leaks. If you can see daylight around a door or window frame, then the door or window leaks. You can usually seal these leaks by caulking or weather stripping them. Check the storm windows to see if they fit and are not broken. You may also wish to consider replacing your old windows and doors with newer, high-performance ones. If new factory-made doors or windows are too costly, you can install low-cost plastic sheets over the windows.

If you are having difficulty locating leaks, you may want to conduct a basic building pressurization test:

1. First, close all exterior doors, windows, and fireplace flues.
2. Turn off all combustion appliances such as gas burning furnaces and water heaters.
3. Then turn on all exhaust fans (generally located in the kitchen and bathrooms) or use a large window fan to suck the air out of the rooms.

This test increases infiltration through cracks and leaks, making them easier to detect. You can use incense sticks or your damp hand to locate these leaks. If you use incense sticks, moving air will cause the smoke to waver, and if you use your damp hand, any drafts will feel cool to your hand.

On the outside of your house, inspect all areas where two different building materials meet, including:

- All exterior corners
- Where siding and chimneys meet
- Areas where the foundation and the bottom of exterior brick or siding meet.

You should plug and caulk holes or penetrations for faucets, pipes, electric outlets, and wiring. Look for cracks and holes in the mortar, foundation, and siding, and seal them with the appropriate material. Check the exterior caulking around doors and windows, and see whether exterior storm doors and primary doors seal tightly.

When sealing any home, you must always be aware of the danger of indoor air pollution and combustion appliance "backdrafts." Backdrafting is when the various combustion appliances and exhaust fans in the home compete for air. An exhaust fan may pull the combustion gases back into the living space. This can obviously create a very dangerous and unhealthy situation in the home.

In homes where a fuel is burned (i.e., natural gas, fuel oil, propane, or wood) for heating, be certain the appliance has an adequate air supply. Generally, one square inch of vent opening is required for each 1,000 Btu of appliance input heat. When in doubt, contact your local utility company, energy professional, or ventilation contractor.

### **Insulation**

Heat loss through the ceiling and walls in your home could be very large if the insulation levels are less than the recommended minimum. When your house was built, the builder likely installed the amount of insulation recommended at that time. Given today's energy prices (and future prices that will probably be higher), the level of insulation might be inadequate, especially if you have an older home.

If the attic hatch is located above a conditioned space, check to see if it is at least as heavily insulated as the attic, is weather stripped, and closes tightly. In the attic, determine whether openings for items such as pipes, ductwork, and chimneys are sealed. Seal any gaps with an expanding foam caulk or some other permanent sealant.

While you are inspecting the attic, check to see if there is a vapor barrier under the attic insulation. The vapor barrier might be tarpaper, Kraft paper attached to fiberglass batts, or a plastic sheet. If there does not appear to be a vapor barrier, you might consider painting the interior ceilings with vapor barrier paint. This reduces the amount of water vapor that can pass through the ceiling. Large amounts of moisture can reduce the effectiveness of insulation and promote structural damage.

Make sure that the attic vents are not blocked by insulation. You also should seal any electrical boxes in the ceiling with flexible caulk (from the living room side or attic side) and cover the entire attic floor with at least the current recommended amount of insulation.

Checking a wall's insulation level is more difficult. Select an exterior wall and turn off the circuit breaker or unscrew the fuse for any outlets in the wall. Be sure to test the outlets to make certain that they are not "hot." Check the outlet by plugging in a

functioning lamp or portable radio. Once you are sure your outlets are not getting any electricity, remove the cover plate from one of the outlets and gently probe into the wall with a thin, long stick or screwdriver. If you encounter a slight resistance, you have some insulation there. You could also make a small hole in a closet, behind a couch, or in some other unobtrusive place to see what, if anything, the wall cavity is filled with. Ideally, the wall cavity should be totally filled with some form of insulation material. Unfortunately, this method cannot tell you if the entire wall is insulated, or if the insulation has settled. Only a thermographic inspection can do this.

If your basement is unheated, determine whether there is insulation under the living area flooring. In most areas of the country, an R-value of 25 is the recommended minimum level of insulation. The insulation at the top of the foundation wall and first floor perimeter should have an R-value of 19 or greater. If the basement is heated, the foundation walls should be insulated to at least R-19. Your water heater, hot water pipes, and furnace ducts should all be insulated. For more information, see our insulation section.

### **Heating/Cooling Equipment**

Inspect heating and cooling equipment annually, or as recommended by the manufacturer. If you have a forced-air furnace, check your filters and replace them as needed. Generally, you should change them about once every month or two, especially during periods of high usage. Have a professional check and clean your equipment once a year.

If the unit is more than 15 years old, you should consider replacing your system with one of the newer, energy-efficient units. A new unit would greatly reduce your energy consumption, especially if the existing equipment is in poor condition. Check your ductwork for dirt streaks, especially near seams. These indicate air leaks, and they should be sealed with duct mastic. Insulate any ducts or pipes that travel through unheated spaces. An insulation R-Value of 6 is the recommended minimum.

### **Lighting**

Energy for lighting accounts for about 10% of your electric bill. Examine the wattage size of the light bulbs in your house. You may have 100-watt (or larger) bulbs where 60 or 75 watts would do. You should also consider compact fluorescent lamps for areas where lights are on for hours at a time. Your electric utility may offer rebates or other incentives for purchasing energy-efficient lamps.

### **Professional Home Energy Audits**

Professional energy audits generally go into great detail. The energy auditor should do a room-by-room examination of the residence, as well as a thorough examination of past utility bills.

Many professional energy audits will include a blower door test. Most will also include a thermographic scan. There's also another type of test—the PFT air infiltration measurement technique—but it is rarely offered.

### **Preparing for an Energy Audit**

Before the energy auditor visits your house, make a list of any existing problems such as condensation and uncomfortable or drafty rooms. Have copies or a summary of the home's yearly energy bills. (Your utility can get these for you.) Auditors use this information to establish what to look for during the audit. The auditor first examines the outside of the home to determine the size of the house and its features (i.e., wall area, number and size of windows). The auditor then will analyze the residents' behavior:

- Is anyone home during working hours?
- What is the average thermostat setting for summer and winter?
- How many people live here?
- Is every room in use?

Your answers may help uncover some simple ways to reduce your household's energy consumption. Walk through your home with the auditors as they work, and ask questions. They may use equipment to detect sources of energy loss, such as blower doors, infrared cameras, furnace efficiency meters, and surface thermometers.

### **Selecting an Energy Auditor**

There are several places where you can locate professional energy auditing services. Your state or local government energy or weatherization office may help you identify a local company or organization that performs audits. They may also have information on how to do your own audit. Your electric or gas utility may conduct residential energy audits or recommend local auditors. Also check your telephone directory under headings beginning with the word "Energy" for companies that perform residential energy audits. See the Learn More section on the right side of the page (or below if you've printed it out) for more auditor resources.

Before contracting with an energy auditing company, you should take the following steps:

- Get several references, and contact them all. Ask if they were satisfied with the work.
- Call the Better Business Bureau and ask about any complaints against the company.
- Make sure the energy auditor uses a calibrated blower door.
- Make sure they do thermographic inspections or contract another company to conduct one.

## Office Energy Saving Tips for Businesses (From Pacific Gas and Electric)

**Fast & Free** = Things you can do right now, at no cost to you!

### Office Equipment

**Fast & Free** Turn off PCs, monitors, printers, copiers, and lights every night and when not being used. If you can't turn off the whole computer, turn off the monitor and printers.

- When purchasing PCs, monitors, printers, fax machines and copiers, consider ENERGY STAR models that "power down" after a period of inactivity. If appropriate, use laptop computers - they consume 90% less energy than desktop computers.
- If appropriate, use ink-jet printers - they consume 90% less energy than laser printers.

### Lighting

- Replace incandescent light bulbs with compact fluorescent light bulbs. Fluorescent lamps can give the same amount of light as incandescent bulbs, and replacing just half of your light bulbs with CFLs can reduce your lighting energy use by up to 38%. Even though these bulbs cost more, they last up to 10 times longer!

**Fast & Free** Consider removing excess fluorescent lights and installing reflectors.

**Fast & Free** Turn off nonessential and decorative lighting, especially in unoccupied areas.

- Use task lighting to directly illuminate work areas instead of area lighting.

**Fast & Free** Lower the height of light fixtures to increase usable light.

**Fast & Free** Color code or mark lights switches and circuit breakers that can be turned off when not needed.

- Install motion detectors or dimmers to control lighting in frequently unoccupied areas, such as restrooms.
- Install more efficient security and parking lot lighting - high pressure sodium fixtures are more efficient than metal halide, mercury vapor, fluorescent or incandescent fixtures.

- Install time clocks or photoelectric cells to control exterior lighting, advertising sign lighting and some interior lighting.
- Rewire restroom fans to operate with the lights.
- Paint dark walls and ceiling with lighter colors to maximize the effect of existing lighting. Dark walls require more power to produce the same amount of light.
- Maximize natural lighting by installing skylights, solar tubes or windows.

## HVAC

- Consider replacing old HVAC systems with the new, energy-efficient systems.
- Install time clocks or setback-programmable thermostats to turn off systems when the building is unoccupied to maximize efficiency.
- Perform scheduled maintenance on units including cleaning condenser coils, replacing air filters regularly, tightening and replacing belts, and checking ducts and pipe insulation for damage.
- Install blinds, solar screens or shades to cool office.
- Install reflective window film or awnings on all south- and west-facing windows.

 Keep vents closed in unoccupied areas to prevent heating and cooling of storage areas and closets.

 For optimal energy savings, set thermostats at 78 degrees F for cooling in the summer and 68 degrees F for heating in the winter. This will save 10-20% of cooling costs and 5-20% of heating costs.

- Install ceiling and wall insulation. If your ceiling is not insulated or scantily insulated, consider increasing your insulation to reduce heating costs by up to 25%.
- Insulate water heaters and supply pipes.
- Install intermittent ignition devices on gas furnaces to save gas.

## Weatherization

- Install weather stripping around exterior doors and operable windows, and around doors between heated and unheated or cooled and non-cooled spaces.
- Install door bottoms, threshold, or door “shoes” to seal gaps beneath exterior doors.
- Insulate exterior walls and floors, and insulate roof or ceiling spaces to R-19 standards or above wherever possible.
- Install window treatments such as shade screens, shades, awnings, or overhangs where feasible. Consider interior window film, insulated drapes, blinds, or removable insulation material.

## Refrigeration

- Perform scheduled maintenance on all units.

 Keep evaporator coils clean and free of ice build-up.

 Remove internal shelf lights to reduce refrigeration and lighting energy use.

 Remove all, or every other, incandescent bulb over refrigerated meat displays.

Install auto door-closers and strip curtains on walk-in freezers and coolers, and keep doors open as little as possible during unloading and restocking.

 Check for proper refrigerant charge monthly.

## Home Energy Saving Tips for Homes

 = *Things you can do at home right now, at no cost to you!*

### Lighting

- Replace incandescent bulbs with fluorescent lamps with screw-in bases. Fluorescent lamps can give the same amount of light as incandescent bulbs, and replacing just half of your light bulbs with CFLs can reduce your lighting energy use by up to 38%. Even though these bulbs cost more, they last up to 10 times longer!
- One bulb is better than two. Use one higher wattage bulb instead of several with lower wattage. One 100-watt bulb produces more light than two 60-watt bulbs and uses less power.

 Turn off lights when not being used (even energy-saving fluorescents).

### Air Conditioning & Heating

- Replace or clean furnace filters once a month. Dirty filters restrict airflow and increase energy use. Keep your furnace clean, lubricated and properly adjusted to save up to 5% of your heating costs.
- Install a programmable thermostat. If you have a heat pump, select a thermostat designed for heat pumps. Setback thermostats can save up to 15% on energy costs.

**Fast & Free** Set your thermostat to 78 degrees or higher during the summer. Save 10-20% of cooling costs.

**Fast & Free** Turn your thermostat down to 68 degrees during the day during the winter. Save anywhere between 5-20% of your heating costs.

**Fast & Free** Don't turn your thermostat lower than normal to cool your home faster. The house will still cool at the same rate and energy will be wasted.

- Plug your home's leaks. Install weather-stripping or caulk leaky doors and windows and install gaskets behind outlet covers (save up to 10% on energy costs). To find out more, attend a workshop on basic home weatherization.
- Repair and seal ducts. Leaking ductwork accounts for more than 25% of heating costs in an average California home.
- Increase ceiling insulation. If your ceiling is not insulated or scantily insulated, consider increasing your insulation to reduce heating costs by up to 25%. Insulation is measured by R-Value. The R-value in insulation designates its resistance to heat flow. The higher the R-value, the greater the insulating ability - the more effective it is. Generally speaking, each time you double the R-value of insulation, you cut your conduction heat loss in that area in half. For more information about determining the R-value for an existing house, visit the Department of Energy's [Insulation Fact Sheet](#).

**Fast & Free** When you're away from home during the summer cooling months, turn off your cooling system completely if you will be away for a couple of days. Save 5-12% on your cooling costs.

**Fast & Free** Keep your fireplace damper closed unless a fire is burning to prevent up to 8% percent of your furnace-heated air from going up the chimney.

## Appliances

- Select the most energy-efficient model when buying a new ENERGY STAR refrigerator, washer, or other appliance. Savings: 5-25% of operating costs.

**Fast & Free** Give your refrigerator breathing room against the wall, clean the coils, and don't set the temperature too low. Fresh foods keep at 37-42 degrees Fahrenheit; frozen foods keep at 0-5 degrees Fahrenheit.

**Fast & Free** Open door on your refrigerator or freezer only when necessary. Each time you open the refrigerator door, the compressor will run for 8-10 minutes to keep the inside cold.

**Fast & Free** Unplug the spare refrigerator in the garage if you don't truly need it. This seemingly convenient way to keep extra drinks cold adds up to 25% to your monthly bill.

**Fast & Free** Unplug small appliances and electronic devices when not in use. Many new TVs, VCRs, computers peripherals and chargers use electricity even when they are switched off.

## Water Heating

**Fast & Free** Keep the tank clean. Periodically drain off the sediment in the bottom of the tank. Sediment buildup can insulate the water from the heating element. Open the drain valve or faucet at the base of the water tank and drain a gallon or two of water into a container until it runs clean.

**Fast & Free** Give your water heater a vacation too. When you leave your home for a weekend or longer, turn your electric water heater off (check your owner's manual for the manufacturer's instructions), or turn your gas water heater to the "pilot" setting. Electric water heaters are most easily shut off using the circuit breaker panel. Turning off a water heater for less than 48 hours is not recommended.

- Wrap the hot water tank with jacket insulation if your hot water heater doesn't have an "Energy Guide" label indicating it is energy efficient. This is especially valuable for older water heaters with little internal insulation. Be sure to leave the air intake vent uncovered (save up to 10% on water heating costs).

## Hot Water Use

- Install low-flow showerheads and faucets or flow restrictors. Save 10-16% of water heating costs.

**Fast & Free** Take showers instead of baths, and shorten your shower time. Baths use 4.5 times more hot water than showers, and cutting your shower in half will reduce water heating costs by 33%.

- Check for leaks. In just one month, a leaking hot water faucet can waste hundreds of gallons of hot water.

**Fast & Free** Set your water heater thermostat to the "normal" setting or 120 degrees, unless the owner's manual for your dishwasher requires a higher setting. Save up to 7-11% of your water heating costs.

- Operate your dishwasher only with full loads. And if the manufacturer's instructions permit, open the door of the dishwasher at the end of the last rinse cycle, rather than using the drying cycle. Save 40% of dishwashing energy cost.
- Avoid using the "rinse hold" setting on your dishwasher which uses up to seven more gallons of hot water per use. Use shorter cycles in the dishwasher.

 Wash clothes in cold or warm water. Always rinse in cold water. Wash full loads or adjust the water level to fit the size of you load. Using cold water reduces your washer's energy use by 75%.

### **Clothes Drying**

- Dry two or more loads in a row, taking advantage of the heat still in the dryer from the first load.
- Don't overdry clothes; it wastes energy, causes shrinkage, and shortens the life of the clothes.

### **Other Tips**

- Get an Energy Audit!! These are often provided for free or at low cost through your local power company. There are also professional firms that can provide this service.

### **Resources:**

#### **Quick List of Energy Star Resources for Buildings**

[http://www.energystar.gov/ia/business/challenge/get\\_started/QuickListBusiness.pdf](http://www.energystar.gov/ia/business/challenge/get_started/QuickListBusiness.pdf)

#### **Quick List of Energy Star Resources for Homes**

[http://www.energystar.gov/ia/business/challenge/get\\_started/QuickListHomes.pdf](http://www.energystar.gov/ia/business/challenge/get_started/QuickListHomes.pdf)

#### **Energy Star Guidelines for Superior Energy Management**

[http://www.energystar.gov/ia/partners/publications/pubdocs/ES\\_Guidelines%20Poster\\_FINAL\\_12APR06.pdf](http://www.energystar.gov/ia/partners/publications/pubdocs/ES_Guidelines%20Poster_FINAL_12APR06.pdf)

#### **Bring Green to Work/ Green at Home Tip Sheet**

[http://www.energystar.gov/ia/business/challenge/bygtw/EPA\\_T4293\\_BYGTW\\_TpCrd\\_508.pdf](http://www.energystar.gov/ia/business/challenge/bygtw/EPA_T4293_BYGTW_TpCrd_508.pdf)

#### **Energy Star Information for Building and Plants- Includes information for businesses, schools, industrial and retail.**

[https://www.energystar.gov/index.cfm?c=business.bus\\_index](https://www.energystar.gov/index.cfm?c=business.bus_index)

### **Kentucky Department for Energy Development and Independence**

<http://www.energy.ky.gov/>